

TOURISM AND THE ENVIRONMENT

ISSUES OF CONCERN IN THE COASTAL ZONE OF GOA

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Introduction

When Goa joined the Indian Union in December 1961, its only large industry was the export of its rich ores of iron and manganese. Goans depended on indigenous fish and coconuts for their vital nutritional requirements. The popularity of milk and vegetables amongst local inhabitants was low, and most of their dietary and other consumer items were imported. Before 1961, Goa had very little “development” in the modern sense of the term. With rich coastal biodiversity and abundant natural resources, the quality of life and the social fabric was good. Its main assets were its genial and peace loving people, a tranquil and unspoiled environment, and an absence of population pressure¹.

Tourism was adopted as a key sector for Goa’s development, not only for the well-established reasons of increasing income and employment but also for its potential to generate non-manual employment in a state with an increasingly educated work force and limited industrial growth. Fearing industrial pollution, the planners and decision-makers opted for tourism as an avenue to earn the state’s income over increased industrial development in addition to mining. Except at academic levels, very little awareness and understanding existed back then among planners about the processes of the life support systems of the coastal environment and the interactive roles played by each component. This paper highlights the issues and the implications of tourism on the coastal marine and the socio-economic environment of Goa.

Nature and Growth of Tourism in Goa

Most of the tourism in Goa is concentrated in the coastal stretches of Bardez, Salcete, Tiswadi and Marmagao. Over 90 percent of domestic tourists and over 99 percent of the international tourists frequent these areas. Consequently, beach tourism is the only type that is avidly encouraged by policymakers and other concerned parties alike. Goa is visited by two types of tourists with distinct needs which this state satisfies. The first is the domestic tourists, who comprise 80 percent of all tourists. These people come in search of the culture that is “different” from the rest of India, as the Goan image holds a degree of mysticism, a sense of freedom and “unconventional” dress style. The second is the international tourists who visit Goa purely for the natural environment—sun and beaches. Within the category of international tourists are there are two sub-categories: backpackers and charter tourists. Although both visit Goa for the beaches, they stay away from each other. The backpackers are not found in areas of charter tourists; they prefer to mingle and live with the local communities. Whereas, the charter tourists tend to stay in the luxury starred hotels. Domestic and international tourists also differ in terms of the areas they frequent. For the domestic tourist, the beaches hold limited appeal, so domestic tourists remain away from the places frequented by the international tourists.

The timings of visits are clearly different for the domestic and the international tourists. In previous decades, a clear off season for all tourists could be identified, today this is not so for domestic

¹ Alvares, C. 1993. “Fish, Curry and Rice: A Citizen’s Report on the State of the Goan Environment.” *Ecoforum*. Goa, p. 260; Mascarenhas, A. *et al.* 1997. *The Coastal Zone of Goa: Then and Now*. Abstract 29. *Seminar on Coastal Zone Environment and Management*. Mangalore University. February 12-14, pp. 50-52.

tourists, who come throughout the year albeit in larger numbers in the non-monsoon months. Conversely, international tourists avoid the monsoon months, as for them the use of the beach is the prime attraction to come to Goa.

Table 1 gives the share of domestic and international tourists over the last 15 years. The bulk of tourists coming to Goa are domestic, and this trend has grown considerably in the last few years.

Table 1. Share of Domestic and International Tourists of Goa

<i>Year</i>	<i>Total tourists</i>	<i>Share of domestic (%)</i>	<i>Share of international (%)</i>	<i>Year</i>	<i>Total tourists</i>	<i>Share of domestic (%)</i>	<i>Share of international (%)</i>
1981	439,015	93.33	6.67	1989	862,443	89.40	10.60
1982	477,165	94.13	5.87	1990	881,323	88.16	11.84
1983	530,015	93.67	6.33	1991	835,067	90.63	9.37
1984	669,992	90.71	9.29	1992	896,010	86.45	13.55
1985	775,212	88.05	11.95	1993	969,234	82.39	17.61
1986	834,081	88.31	11.69	1994	1,059,595	80.16	19.84
1987	861,448	89.02	10.98	1995	1,107,705	79.31	20.69
1988	854,935	89.11	10.89	1996	1,150,000	78.26	21.74

Source: India, Government of Goa, Department of Tourism. Personal Communications.

The various factors that have contributed to this rise in domestic tourism are:

- increased disposable income of the middle class,
- increased urbanization and stress of living in cities and towns,
- increased ownership of cars, which is making domestic tourism more attractive, especially among the upper-middle and middle classes²,
- improved employment benefits, such as the leave travel concession,
- development of inexpensive mass transport and improved connections to various places of tourist interest³,
- increased number of cheap accommodations and resorts,
- greater advertising targeted at domestic tourists both by the central and the state governments, as well as the tourist industry, and
- development of time sharing of holiday accommodations, that is being targeted at the middle class.

According to official tourism statistics, while the period of 1981-86 saw an increase in domestic and international tourists, the period of 1986-91 saw a slow down in growth rates for domestic tourists and a fall in growth rates for international tourists (Table 2).

Table 2. Growth of Tourism in Goa

² For example, the number of registered cars, jeeps and taxis has gone up sharply from 310,000 in 1960 to 3,330,000 in 1993.

³ The commissioning of the coastal Konkan Railway and the modernization of South-Central Railway will considerably increase the accessibility of Goa to the rest of India. A form of weekend tourism is likely to emerge from this, which may have environmental and economic impacts similar to cruise tourism in the Caribbean Islands.

<i>Period</i>	<i>Average Annual Growth Rates (%)</i>	
	<i>Domestic</i>	<i>International</i>
1981/82-86/87	7.98	27.20
1986/87-1991/92	2.75	-1.34
1991/92-95/96	3.90	31.00

Source: India, Government of Goa, Department of Tourism. Personal Communications.

Tourist arrivals in Goa have increased over the last five years with a higher rate of growth of international tourists than domestic tourists. Goa's growing importance on the Indian tourist map for international tourists can be seen from Table 3. While in the early 1980s, the share of international tourist that came to Goa was less than 3 percent, by the mid-1990's, the share has increased to over 10 percent.

Table 3. International Tourist Arrivals in India

<i>Year</i>	<i>Tourist arrivals in India (millions)</i>	<i>Share of Goa in total tourist arrivals in India (%)</i>	<i>Year</i>	<i>Tourist arrivals in India (millions)</i>	<i>Share of Goa in total tourist arrivals in India (%)</i>
1981	1.26	2.4	1989	1.74	5.2
1982	1.29	2.3	1990	1.71	5.9
1983	1.30	2.3	1991	1.68	7.8
1984	1.21	4.9	1992	1.87	6.4
1985	1.26	7.1	1993	1.82	9.3
1986	1.45	6.2	1994	1.87	11.2
1987	1.48	6.4	1995	2.10	10.9
1988	1.59	5.9			

Source: Center for Monitoring the Indian Economy. 1995. *Basic Statistics of the Indian Economy*; and India, Government of Goa, Department of Tourism. Personal Communications.

In the earlier years, the international tourist was one in search of alternative lifestyles and mingling with local communities; however, in more recent years, a considerable homogenization of the traveler has occurred in terms of package tourism. In the 1980s, the domestic tourist came from the middle class and from the adjoining states; however, now domestic tourists that come to Goa are diversifying, as the place attracting a number of the rich young elites from more distant states. In response to these changes, the tourism industry in Goa has evolved into a curious mix of low-budget tourism and up-market hotel development, a mix that is marked with tensions and potential conflicts over the appropriation of resources⁴.

Impacts of Tourism in Goa

⁴ Wilson, D. 1997. "Paradoxes of Tourism in Goa." *Annals of Tourism Research*. 21(1): 52-75; Wilson, D. 1997. "Strategies for Sustainability: Lessons from Goa and Seychelles." *Sustainable Tourism*. M. Stabler (Ed.) Wallingford: CAB International.

Tourism development among policy-makers tends to be discussed in terms of the factors that are of concern to the national and the state governments. The discussion is very much economic in nature with some industry orientation and focuses on factors such as the revenues from tourism, the foreign exchange earnings, the employment created and the income generated⁵. The focus has always been on the implications of tourism development on the economy of Goa and on the relations among the various components of its tourism industry. The microlevel impact of tourism on the destination area immediately around it has been relatively less studied, if at all⁶. The impacts of such a large-scale, diversely interactive activity as tourism should be more inclusive of all components. Tourists travel to and from their destinations, are accommodated, fed and entertained. All these activities require extensive infrastructural networks and support services that may not remain limited to the geographical positions of a tourist's movements. Moreover, the effects result very much from the interactions among the tourists and the agents in the destination area.⁷

Economic Aspects

The foreign exchange earning potential of the tourism industry is one of the main attractions for its support by national governments, while state governments are more concerned with its contribution to local income, taxes and employment. On an average, earnings in foreign exchange for the last three years were US\$43-57 million⁸. It is estimated that tourism contributes to around 13.7 percent of Net State Domestic Product; 7 percent of employment and 7 percent to state tax revenues. The money spent by domestic and international tourists is received by different segments of the industry which provide the supporting goods and services.

Tourist receipts can be classified into five categories: accommodation and food, shopping, internal travel, entertainment and miscellaneous items. Table 4 provides an overview of the distribution of expenditures among the five categories for international and domestic tourists.

Moreover, in 1992, about 90 percent of the domestic tourists who came to Goa spent less than US\$35 per capita per day. Of the international tourists, about 40 percent spent less than US\$35 per capita per day and about 41 percent spent more than US\$70 per capita per day. As mentioned earlier, however, this trend is changing today (Table 5). In the last few years indications are that the domestic tourist coming to Goa is increasingly from the more affluent segments of society, and the international tourist have increasingly been more of the inexpensive charter packages.

⁵ See Kirloskar Consultants Ltd. 1994. *Report on Study of Tourism Industry in Goa*. December.

⁶ See the Indian Institute of Social Sciences (1989) for an attempt at studying socio-economic impacts.

⁷ Impact studies tend to treat destination areas as passive recipients of the impacts of tourism. This is however not so and the need to understand the processes of interaction between tourists and host communities is crucial to an understanding of impacts.

⁸ This figure is probably an underestimate, as it is a record of foreign currency converted in Goa; however, a considerable amount of foreign currency that is spent in Goa is converted at the first port of entry, typically Mumbai (Bombay) or New Delhi. If India's total foreign exchange earnings from tourism are considered and Goa is apportioned an amount based on the share of tourists that come to Goa, then the amount rises to around US\$115 million.

Table 4. Distribution of Expenditures for International and Domestic Tourists

<i>Category</i>	International Tourists	Domestic Tourists
	(%)	(%)
Accommodations and food	53.95	58.20
Shopping	24.84	26.70
Internal transport	13.63	10.40
Entertainment	2.61	1.80
Miscellaneous expenses	4.97	2.90
Average length of stay	9 days	5 days
Total amount spent per visit	US\$590	US\$110

Source: Kirloskar Consultants Ltd., 1994. *Report on Study of Tourism Industry in Goa*. December.

Table 5. Estimated Distribution of Expenditures and Distribution of Tourists in 1992

<i>Type of tourist</i>	<i>Percentage distribution of daily expenditures (US\$)</i>					<i>Average total expenditures per stay (US\$)*</i>
	<17	17-34	34-51	51-69	>69	
Domestic	63	27	4	3	3	105
International	18	22	11	8	41	590

* Average length of stay for a domestic tourist is estimated to be 5 days; 9 days for an international tourist.

Source: Kirloskar Consultants Ltd., 1994. *Report on Study of Tourism Industry in Goa*. December.

Table 7.2.

These expenditures form the direct output of the industry. However, the industry buys goods and services from other sectors of the economy. This additional output produced through inter-industry spending is the indirect output of the industry and is normally estimated using multipliers. It is not quite clear how much tourism is actually benefiting the Goan economy as a whole because a large part of the goods required to support the tourism industry is brought from outside the state.

Tourism: Food and Agriculture

Food and beverages comprise the largest component of the expenditure of domestic tourists (40 percent) and second largest component of the expenditures (accommodations being the largest), of the international tourist (20.5 percent). Increasing the amount of local food used in the tourism industry is a way of increasing backward linkages from tourism, involving the local community and therefore, moving toward more diversified and sustainable development. Yet, policymakers have not focused on strengthening the economic linkages between tourism and the food sector. The hotel food supply chain has not been studied in Goa and local surplus production from agriculture and fishing could be potentially integrated into this chain as an additional means to generate local income. However, a careful balance must be struck between producing for tourists' requirements and ensuring food supply at reasonable prices to the locals.

Regional Imbalances

As previously mentioned, most of the tourism development in Goa is concentrated in the four coastal stretches of Bardez, Salcete, Tiswadi and Marmagao. These areas are, similarly, the most developed regions of Goa, accounting for approximately 66 percent of Goa's Gross State Domestic Product (GSDP). They have dense settlements and are more developed in terms of infrastructural support services. About 70 percent of small-scale units, 78.5 percent of the capital investment in small industry and over 68 percent of the employment in this sector are found here. Historically, the region developed relatively faster than the rest of the state due to its coastal location, which provided easy access for sea trade and was attractive for settlement. There are a number of interesting locations with tourism potential exist in the hinterland; however, very little has been done to develop them. Hence, there is a considerable imbalance between the coastal and the hinterland regions in infrastructural and other indicators of economic development.

Investment in the Tourist Industry

Since tourism's acceptance as the primary avenue through which to develop, it has grown in scope to be comparable with mining, the only other industry in Goa. State expenditures on the tourism industry has doubled over a period of 10 years. Expenditures amounted to approximately Rs.15 million in 1986-87, and they grew to approximately Rs.30 million by 1996-97 (Table 6).

Table 6. Expenditures of the State on Tourism per Plan

<i>Annual plan</i>	<i>Actual expenditures (Rs. Millions)</i>
1992-93	22.96
1993-94	25.93
1994-95	27.01
1995-96	29.25
1996-97	30.00
EIGHT PLAN (1992-97)	135.15

Source: India, Government of Goa, Department of Town and Country Planning and Department of Statistics and Evaluation Department. Personal Communications.

Private investment also increased. If the investment per room by hotel category, which was estimated by Kirloskar Consultants 1994, investment in the hotel industry has risen from Rs.2.08 billion to Rs.3.25 billion in 1996, an increase of Rs.1.19 billion in just 2 years. If the type of hotels that have been built over the last two years is analyzed, investment in starred hotels increased by 39.5 percent during this period while that in other hotels has gone up by 47.5 percent⁹. Tourism studies suggest that the financial performance of the hotel industry is poor compared to several other industries in the state although no evidence has been presented to back this claim¹⁰.

⁹There are six categories of approved hotels in India ranging from one- to five-star deluxe. Approval ratings are granted by the Department of Tourism based on suitability criteria for international tourists. These starred hotels are required to maintain certain minimum standards of services and amenities.

¹⁰ India Institute of Social Sciences. 1989. *Tourism in Goa: Socio-Economic Impacts*. New Delhi; Kirloskar Consultants Ltd. 1994. *Report on Study of Tourism Industry in Goa*. December.

From the statistics available and through observation, local participation in the tourism industry is high in terms of the number of small hotels and paying guest accommodations, yet the bulk of economic investment is concentrated in just a few hotels. Thus, using just the accommodation sector as a proxy for the tourism industry as a whole in 1996, almost half of all investment in the sector was in the hands of just four large hotels; the largest hotels together controlled 69 percent of all investment, and the balance was made up by smaller hotels.

Seasonality of Income and Employment

The industry peaks and troughs: October-February being the good months and June-August being the lean months due to the monsoon. This seasonality requires the tourism industry to respond by adjusting the output in terms of the services it provides which affects hotels, restaurants and their employees. Because of the search and initial training costs that the employer faces, and because of the need to cater to sudden spurts of demand, a hiring and firing policy is not cost-effective to an employer¹¹. The first reaction of employers is to keep labor, but reduce the work hours, a situation akin to holding inventories of labor in excess of demand. This strategy is supported by employing unskilled labor during the peak season, who are then laid off during the off season as the costs of hiring and firing unskilled labor are not high. A sample survey indicates that the highest seasonality of income (in terms of lower off season earnings) and the highest seasonality of employment (in terms of hours worked per week) are experienced by the smaller hotels¹². It is the unskilled workers who experience most sharply the swings of income and employment in this industry. This is a social cost of the industry to which hitherto scant attention has been paid.

Social Aspects

Shifts in Population and Traditional Occupations

In the tourist belts of Calangute-Candolim in Bardez, a shift in the composition of the resident population has occurred to include a large number of migrants from the states of Karnataka, Rajasthan and Kashmir due to potential employment in the tourism industry. Most of these people are engaged in selling artisanal pieces, handicrafts and garments. It cannot be denied that tourism has also given a boost to local art and handicrafts; however, the commercialisation of such arts and crafts has resulted in a certain deterioration in their quality as they are being manufactured for bulk sale. At another level, Goan cultural practices are being used as tourist attractions, such as Carnival and Shigmo, which have been given a certain orientation to suit the demand of tourists. Much of the spontaneity of these practices has been lost¹³.

Moreover, some of the villages along the coasts have become very tourist-oriented and thus, shifted away from their traditional occupations. A couple of decades ago, these villages were predominantly fishing- or agricultural-oriented. Tourism has increased land prices and encouraged locals to sell their land, thereby sharply increasing the competition for land in the tourist belt. It can be argued that tourism has accelerated the decline of agriculture in Goa, by providing a viable alternative for the lateral transfer of investment capital, land, and labor by the locals. In the tourist belt, land conversion

¹¹ D'Douza, E. 1997. *Economy and Institutions: Essays on Goa*. Bombay: Himalayan Publishing House.

¹² *ibid.*

¹³ *ibid.*

from agriculture to non-agriculture uses has occurred¹⁴. In the fishery sector, while fishermen do not always compete with tourists for shore space, there are instances on the Goan coasts where traditional fishing operations have been constrained by lack of shore space. In some areas, fishing ports and the houses of fishermen have been displaced by resort development.

Economic forces are driving social forces here. On the one hand, expectations of higher returns, from the sale of land to builders and/or from hiring out houses to tourists rather than from actively engaging in agriculture or fishing are creating incentives for shifting occupations. On the other hand, social forces are at work in the sense that tourism provides locals with an opportunity to keep their women at home rather than have them till the soil or sell fish in the market. This is perceived as a movement upwards for the locals, and a factor that cannot be ignored in the dynamics of the intersectoral movement of land and labor. Often large tourism development projects require the displacement of some of the original inhabitants of the area. Some of those displaced by present projects, chose to invest their compensations in capital assets, e.g., taxis, and have become to a degree upwardly mobile in an economic sense. However, there are others who due to their initial circumstances are unable to move along the same path, and instead become marginalized, having to replace self-employment for menial jobs in the very resorts that have displaced them. The issue of income distribution needs to be examined.

Impacts on the Goans' Sense of Community

One of the impacts of tourism on the Goan community is the "creeping expropriation" felt by the locals. This feeling of being pushed out arises from the fact that starred hotels have effectively gained control over beach resources, which locals have used for generations, and are selling access to them at a price. The area that is available to them as commons is increasingly reduced and overpopulated, causing the locals to avoid the beaches as a whole.

Consequently, the growth of tourism in Goa has been accompanied by strong anti-tourism activism¹⁵. Much of this activism has been targeted at: international tourists; unplanned growth; the use of state machinery to promote tourism, which is perceived as distorting the image of Goa and Goan society, the violation of regulations by the hotel lobby; the overdevelopment of the coastal strip; the preferential access to resources, which large tourism projects are able to get relative to small projects and local communities; the impact on local society from exposure to drugs, aids and more recently, pedophiles¹⁶. The bottom-line is that there has been little involvement of the public in the policy decision-making process resulting in a strong sense of alienation about decisions that are affecting the lives of the local community.

Environmental Aspects

Coastal zone environment is particularly fragile and can be divided into two areas: the marine part and the land part. For the purpose of this discussion, coastal waters, bays, backwaters, creeks, tidal inlets, and estuaries are considered as components of the marine part of the coastal zone. The sandy

¹⁴ While conversion of agricultural land to non-agricultural is prohibited by law, the Government of Goa has granted leniency in certain circumstances given the high price of land and the demand for housing.

¹⁵ The most prominent groups are Jagrut Goenkaranchi Fauz (JGF), Citizens Concerned about Tourism (CCAT), Saligao Nagrik Samiti and the Goa Foundation.

¹⁶ This critique is found in the various publications of the aforementioned groups, was reported in local newspapers and more recently, is summarized in the Master plan for Tourism in Goa: Statement of Objectives and Recommendations, 1997, submitted to the government by five NGOs. Also see, Alvares (1993) for an environmental critique of tourism in Goa.

beaches along with two dunes (one which runs along the seashore, and another that runs parallel but about 100 to 500 meters away from the seashore) and their vegetation are considered components of the land part. In between these dunes there lies a sandy plain, which acts as a buffer zone between the main land and the sea.¹⁷

Impacts to the Marine Part of the Coastal Zone

The marine part of the coastal zone provides many functions and in the present context are:

- To support marine flora including subtidal varieties, such as mangroves. The mangrove ecosystem itself serves as a habitat for diverse types of species of birds and marine biota, in addition as the protection of the coastline from erosion, tides and storms¹⁸.
- To support a wide variety of marine organisms including mammals. The marine organisms among themselves form a very intricate, well-established food chain starting with the chemical constituents of sea water called nutrients.
- To function as a natural thermostat which balances the climate on the subregional, regional and global scales.
- To disperse riverine load effectively in near-shore regions.

Most of the above functions are interactive in nature. In the coastal current movement, the most important force is the tidal cycle, which drives the sea water along the shoreline, bays, creeks and upstream through the mouths of rivers and estuaries. Other important forces are the near shore and riverine, or estuarine currents. All these currents carry natural sediment load and any other marine discharge, resulting from manmade activities, and deposits them at a site defined by an equation containing parameters, such as current velocity, counter currents, topography of the seabed or riverbed and other oceanographic factors. The transportation capacity of the currents has to be understood in terms of its effect on marine biota. For example, a rise of a few degrees in temperature of a sea water body would adversely effect species occurrence and predominance among biota, which in turn could influence other life forms. Also, a sudden appearance or disappearance of a species due to anthropogenic factors may cause stress in other species. Given the interactiveness and complexities of the coastal environment, any developmental activity should to be preceded by the Environmental Impact Assessment studies to forestall environmental degradation.

The following impacts on the marine part of the coastal zone have been observed while surveying the ecosensitive coastal areas of Goa. They have been represented in a flowchart in the Annex. The work was carried out by National Institute of Oceanography on request from the Ministry of Environment and Forests, Government of India, in August/September, 1996¹⁹.

- Loss of mangroves: Thick mangroves on the outskirts of Panaji, at Sao Pedro near Old Goa, around Talpona backwaters and at innumerable other locations are being reclaimed. In addition to the biological impacts of the loss of mangroves, the tidal

¹⁷ Lobo, U. 1988. "Environmental Aspects of Silica Sand Mining from Coastal Sand Dunes." *Earth Resources for Goa's Development*, pp. 521-523.

¹⁸ Jagtap, T.J., V.S. Chavan and A.G. Untawale. 1993. "Mangrove Ecosystems of India: A Need for Protection." *Ambio*. v 21, pp. 252-254.

¹⁹ National Institute of Oceanography. 1996. *Comments on the Coastal Zone Management Plans of Goa*. Report submitted to India, Ministry of Environment and Forests. New Delhi.

waters could flood the surrounding coastal areas causing erosion and thus opening the estuarine banks to storm surges²⁰.

- Reduced fish catch and species: A steady decrease in the total annual fish catch has been observed in Goa. The catch has declined from 105.44 thousand tones in 1993-94 to 101.90 in 1994-95 and in 1995-96, to 87.82 thousand tones²¹. More specifically, at Sancoale-Chicalim Bay, the decrease in production of certain varieties of shellfish and crabs, both local delicacies, is believed to be due to the land reclamation of mangrove swamps and to the construction of roads to the Sao Jacinto Island and at Talpona. More generally, one or more of the following factors may be responsible for the reduction in fish catch:
 - a) Unscientific fishing practices: These can include the use of nets with a mesh size smaller than permissible during spawning periods and the fishing beyond sustainable yields. These practices are pursued due to high demand for fresh seafood in the market.
 - b) Loss of spawning grounds: Reasons for this could be mangrove deforestation, land reclamations and siltation. Short-term economic gains from the development of these areas is obviously preferred over the long-term benefits of the conservation of ecology.
 - c) Introduction of anthropogenic material: Any disturbance at any step in the marine food web may inadvertently affect other species. The introduction of untreated sewage and waste to the environment would give rise to toxic algal blooms wiping out many species²². Increased turbidity and sedimentation can also affect the benthic communities.
- Erosion: Dispersion of sediment load at any given point depends upon a number of parameters related to marine currents. Any activity which causes disturbances in these parameters, could alter the sites of deposition and result in erosion, accretion or siltation and changes in the ecology of that area, such as land reclamations, the extraction of sand or the construction of jetties²³. Consequently, there are a large number of cases where coastal stretches have been subjected to the forces of erosion. Prime examples are Campal and Caranzalem near Panaji, Palolem, Agonda and many other places, where a considerable amount of construction activities have occurred²⁴.
- Accretion/siltation: Accretion and siltation is occurring. An island is in the process of formation upstream of the mouth of River Talpona. Due to sand bar formation at the

²⁰ Field, C. 1995. *Journey amongst Mangroves*. International Society for Mangrove Ecosystems. Okinawa, Japan: John Witzig and Company, p. 140.

²¹ *The Navhind Times*. 1997. "Goa's Fish Catch Shows Down Trend". 29 March.

²² Madhupratap, M. and A.H. Parulekar. 1993. "Estuarine Biology and Management." *Environmental Impact on Aquatic and Terrestrial Habitats*, pp. 215-226.

²³ Carter, R.W.G. 1998. *Coastal Environments—An Introduction to Physical, Ecological and Cultural Systems of Coastlines*. London: Academic Press, pp 607; Nordstrom, K.F. 1994. Developed Coasts. *Coastal Evolution—Late Quaternary Shoreline Dynamics*. R.W.G. Carter and C.D. Woodroffe (Eds.) London: Cambridge University Press, pp. 477-510.

²⁴ Lobo, U. 1988. "Environmental Aspects of Silica Sand Mining from Coastal Sand Dunes." *Earth Resources for Goa's Development*, pp. 521-523.

mouth itself, which has been more pronounced in the last few years, the river is navigable only during high tides. In addition, local fishermen have noted siltation in the river bed. All these observations suggest disturbances in the natural sediment load dispersion patterns in the River Talpona.

Impacts to the Land Part of the Coastal Zone

The land part of the coastal zone mainly comprises sandy areas along with the dunes and its vegetation cover. This part provides the following functions:

- To protect the coast from the forces of the oceans,
- To replenish the sand on the beach that is carried away by the sea,
- To gather the sand that is blown landward by the wind with the help of dunes and its vegetation, and
- To serve as habitats for numerous organisms, including turtles.

Sandy areas are also used for tourism development:

- To mix the sand with cement for construction purposes, and
- To develop the land.

All along the coastline of Goa, for example, between Chapora and Sinkerim in Bardez²⁵, Caranzalem and Miramar in Panaji, Salcete Coast in Central Goa and in Galgibaga, Talpona, Palolem in South Goa, there has been a boom in construction activities, most of which are for tourism or for associated purposes. To make space for and to use them as a component of cement for construction, sand is being extracted in substantial amounts. When the environmental functions are weighed against the economic services that sand performs, the fact that the former are not priced, tilts the demand in favor of the economic user-groups. There is need to quantify and monitor such sand losses and their ecological impacts.

The following impacts have been observed on the coastal stretches of Goa due to development activities:

- Loss of sand dunes: Sand dunes have borne the brunt of construction activities along the coastal stretches of Goa²⁶. Anjuna and Baga-Calangute-Candolim stretches in North Goa, and Salcete beaches comprising Betalbatim, Colva, Varca, Cavelossim and Mobor in central Goa, were the first beaches to lose their dunes. Our survey showed South Goa to be the next in line as in Galgibaga, two dunes, 10 meters high, have already been flattened into plateaus at half the heights to make way for construction.

²⁵ William, A. 1997. "Burgeoning Construction May be Epitaph to Queen of Beaches." *The Navhind Times*. 4 March, p 1.

²⁶ Lobo, U. 1988. "Environmental Aspects of Silica Sand Mining from Coastal Sand Dunes." *Earth Resources for Goa's Development*, pp. 521-523; Mascarenhas, A. 1990. "Why Sand Dunes are Needed." *The Herald*. 21 December, p. 4; Mascarenhas, A. 1996. "The Fate of Sand Dunes of Goa." *Voices for the Oceans*. International Ocean Institute of India, p. 111.

- **Endangered species:** Four species of turtles have been reported to frequent the beaches at Morjim, Miramar, Bogmalo and Palolem, covering almost the entire stretch of the Goan Coast²⁷. The "Save The Turtles" campaign of the Goa Foundation, a local Non-Governmental Organization, carried jointly with the Forest Department of the Government of Goa, reported that the number of sea-turtles visiting their nesting sites on different beaches in Goa particularly in Morjim, is steadily decreasing²⁸.
- **Tidal ingress:** The ceaseless mining of sand and sand-dunes have effectively razed gentle slopes of sand which stop the tides from rushing further on the shore. The consequent tidal ingress has reduced the area of beach at different places, such as Miramar in Panaji, Baga-Calangute-Candolim-Sinquerim stretch and Anjuna in Bardez, and in Salcete and Mormugao on the north and central coasts of Goa.

Impacts of Recreational Activities

Recreational facilities affecting the coastal environment are generally, but not limited to, those related to upscale tourist activities. These are:

- **Swimming pools:** The water for this is invariably drawn from subsurface aquifers. The withdrawal of large amounts of ground water in a limited area can be detrimental to the water table of the region, particularly since it is a source of drinking water. Additionally, some parties owning wells with a good underground stream of fresh water sell their water at Rs.100 (US\$2.5) per 500 litre tank to fill these swimming pools. Consequently, the groundwater levels in some coastal areas is decreasing and is frequently accompanied with salt water intrusions. The manifestation of sea water intrusions in the form of salt water in wells along the coastal belt from Chapora to Aguada has been observed in coastal aquifer studies²⁹.
- **Water sports:** Motor boats used in shallow coastal waters continuously disturb the habitats of endangered species and other marine life. Moreover, they tend to degrade water quality by the discharge of oil and grease.
- **Beach driving:** Tourists regularly drive on the beaches during low tide. Concrete ramps have even been constructed to take the vehicles on the beaches such as at Palolem.
- **Beach accommodations:** In the initial states of tourism in Goa, beach shacks became popular due to their small numbers, economical rates and simple decor; however, after several decades, these structures crowd the shorelines without any comfortable space among them, and they lack ecofriendly toilet facilities and proper refuse

²⁷ Gramopadhye, A. 1997. "Earth Day Special: Think Big." *The Herald*. 21 April, p. 8.

²⁸ *The Navhind Times*. 1997. "Sea Turtles on the Run as Humans Take over Beaches." Feb. 20, p 1.

²⁹ Kalavampara, G. 1994. *Preliminary Assessment of Salt Water-Fresh Water Interface between Fort Aguada and Candolim Coast, North Goa*. Msc. thesis. Goa University, p. 71; Carneiro J. R.L. 1996. *Use of Hydrochemical Techniques for Detection of Sea Water Intrusion in Coastal Aquifers between Fort Aguada and Fort Chapora, North Goa*. Msc. Thesis. Goa University, p. 130.

collection, all of which often result in waste invariably find its place in the coastal waters.

- **Sanitation:** Goa lacks modern treatment and disposal systems for both sewage and garbage. Even the internationally famous beach stretch of Baga-Calangute-Sinquerim, does not have rudimentary toilet facilities. Tourists, locals, shop owners and the hordes of migrant laborers, who are employed by construction companies along the beaches, have no other option than to use the beaches to answer the call of the nature.
- **Beach litter:** Plastics are among the very serious problems in a number of Goa's beaches, and an action plan is urgently needed to mitigate the problem³⁰. Both the last mentioned problems could be solved through improved enforcement of regulations and infrastructural improvements.

Impacts of Expanded Transport

Even though tourists in Goa are almost exclusively accommodated in coastal areas, they arrive and depart Goa by some kind of transportation operating in other areas of the state. While the air and sea travel would cause negligible damage to the environment in broad terms, motor vehicles cause air pollution by their uncontrolled exhaust fumes.

Also, the alignment of the Konkan Railway has broad reaching environmental impacts. The laying of the tracks for the railway in Goa, especially through wetlands and tidal marshes at Maxem and between Bali and Mayem along with numerous bridges on the Mandovi-Zuari estuarine fronts, has been done without proper hydrodynamic and geomorphological studies³¹. The gigantic embankments, several kilometers long, supporting the rail lines along the lowlands of Goa have lead to substantial alterations in physical, chemical, biological and geomorphological setups. Blocking, diminuting or increasing the tidal flow has resulted in a major redistribution of sediments giving rise to erosion/deposition or deposition/erosion with conspicuous changes in shorelines or near-shore realms. Mangrove swamps have been destroyed; tidal regimes disrupted; paddy fields flooded, and the embankments are sinking due to soft underlying strata³². A comprehensive analysis of the environmental impacts of the Konkan Railway alignment is needed to study such questions as the following. Is the siltation taking place in the backwaters and estuarine regions of Canacona in South Goa due to river runoffs carrying haphazardly dumped material from the digging out of the railroad? To what extent has the Konkan Railway Alignment through ecosensitive areas contributed to the environmental degradation of estuarine/coastal areas of Goa? In board terms, factors other than tourism could be responsible for the observations made above, but the contributions of the tourism industry in all these situation should be identified given the criticality of the coastal environment demands.

Tourism Policy

³⁰ Alvares, C. 1993. "Fish, Curry and Rice: A Citizen's Report on the State of the Goan Environment." *Ecoforum*. Goa, p. 260; William, A. 1997. "Garbage, Vendors Turn Idyll into Nightmare." *The Navhind Times*. 3 March, p.1.

³¹ *ibid*.

³² Alvares, C. 1993. "Fish, Curry and Rice: A Citizen's Report on the State of the Goan Environment." *Ecoforum*. Goa, p. 260; Gadgil, M. and S. Chandran. 1993. "Konkan Lessons—A Railway Project and the Environment." *Frontline*. 26 March, p. 62; Mascarenhas, A. 1992. "Our Estuaries in Peril." *The Herald*. 20 April, p. 4; Mascarenhas, A., K. Sawkar and O.S. Chauhan. 1997. *The Coastal Zone of Goa: Then and Now*. Abstract 49. *Seminar on Coastal Zone Environment and Management*. Mangalore University, 12-14 February, pp. 50-52.

In the wake of the report, "Our Common Future", by United Nation's Commission on Environment and Development in 1983, India passed its own Environment Protection Act in 1986. This was followed by a Notification in February 1991, inviting the governments of India's coastal states and union territories to prepare Coastal Zone Management Plans for their respective territories. The much publicized Rio Summit in June 1992, along with Indian environmental norms, started a land race for coastal development regardless of the laws, regulations and conventions in vogue. The land race got started probably because the coastal resource users experienced inertia in the implementation of various legislation on the part of the authorities.

It seems increasingly clear that (i) despite several important pronouncements and regulatory mechanisms in place, local planning does not always adhere to guidelines and regulations and (ii) where it does adhere, planning and development regulations have been observed in the breach. Thus, the Government of Goa, in October 1988, published its Regional Development Plan, anticipating, among other activities, the growth of tourism by 2001 A.D. In this plan, a strategy is outlined³³:

"[The] location of new beach resorts should be considered not only from point of view of land availability but also from the consideration of beach resource ecology, based on the Environmental Assessment Studies. Further, spreading thinly on all available sandy beach stretches from Tlerekhol/Arambol in the north to Betul/Agonda in the south is not advisable from the standpoint of conservation of resources both natural and man-made. Instead, it is suggested that beach-head developments at certain selected centers should be encouraged."

Despite these admirable commitments toward conservation and the protection of the coastal environment and ecology, the Regional Development Plan for Goa 2001 A.D. does not contain any reference to the "no development zone" of 200/500 meters from the high-tide line along the seashores, which had been much debated around the country in the early 1980s; nor does it mention the Environment Protection Act of 1986 of the Government of India³⁴. Moreover, the Coastal Zone Management Plans, prepared by the Department of Town and Country Planning of Goa in 1995 and 1996, for approval by the Central Government, actually recommend tourism-related development for almost the entire length of the Goan coastline, barring only a few places, which contradicts the Department's own guidelines.

The current policies and relaxed enforcement thereof have led to the haphazard and uncontrolled growth of townships. Places like Calangute and Candolim in Bardez and Colva in Salcete have become over commercialized and haphazard in their development pattern. These areas have a number of unauthorized constructions, which have paid little heed to local planning rules, infrastructural supports or aesthetics. During the 1980s and the early 1990s, the lure of catering to tourists especially, international tourists and the hope of making rapid profits have led to considerable investment in resorts and apartments. Today there are signs of over investment, this is spreading a price war³⁵. When a certain location is to be developed as a prominent tourist area requiring extensive infrastructural and other support services, it gets developed as a small township. This increases its real estate value manifold,

³³ D'Souza, J.A. et. al., 1988. *The Regional Plan for Goa, 2001 A.D.* India, Government of Goa, Department of Town and Country Planning, October, p. 108.

³⁴ India, Ministry of Environment and Forests. 1991. *The Gazette of India*. Notification: S.O. No. 114 (E), February 20.

³⁵ Wilson, D. 1997. "Paradoxes of Tourism in Goa. *Annals of Tourism Research*. 21 (1), pp. 52-75 and Wilson, D. 1997. "Strategies for Sustainability: Lessons from Goa and Seychelles" in *Sustainable Tourism*. M. Stabler (Ed.) Wallingford: CAB International.

inducing other sectors of the society to set up business and residences in these areas as well. A quick look at the developments along the coasts of Goa and the future plans for it, reveals that:

- i) these follow the ideas submitted in the CZM plan of Goa (which is yet to be formally approved) rather than its Regional Development plan; and,
- ii) the tourists are almost exclusively accommodated along the 105 km stretch of the coastline while little effort has been made to adhere to the regional plans of creating other types of tourism besides beach tourism.

One successful example of regulated tourism development is Seychelles, an island nation in the Indian Ocean. It spared its beaches from concretization and allowed resorts to come almost entirely amongst the coconut groves just behind the sandy stretches, taking care of the coastal marine environment³⁶. This policy, unfortunately, is not in place in Goa where constructions are allowed as close to the waterline as possible.

Conclusions

Although tourism is concentrated along the coastal zone in Goa, it has had a number of positive benefits in terms of increased incomes, increased employment, added avenues for upward mobility for locals, increased revenue and increased foreign exchange earnings. However, there are also some socio-economic and environmental impacts associated with these benefits that need to be highlighted. These impacts have arisen as a result of the trajectory that tourism has followed in Goa and can be summed up as follows:

1. The growth of coastal tourism has been rapid and uncontrolled.
2. The seasonal nature of tourism has led to swings in employment and income most markedly in the small sector and to the unskilled worker.
3. There has been no clear nor firm policy relating to tourism; most decisions have been on a purely ad hoc basis, except for a marked predisposition to upmarket tourism. The policy initiatives that have been introduced are not attentive to local concerns. This has led to some disaffection among locals toward tourists that needs to be studied.
4. There has been a marked spatial concentration of tourism development along the coast, which is leading to heavy demand for resources in these places. Cumulatively, this results in concentration and congestion of population, enormous increase in the density of construction, and related infrastructure and facilities. Consequently, there has been an overall decline in the agricultural sector in the state.
5. It poses major changes in land use, shortages of resources, such as land and water, and damage to coastal aquifers, the sand dune system, and mangrove vegetation.
6. Spawning and breeding grounds have been lost due to anthropogenic activities related to tourism; consequently, fish populations are decreasing and traditional fishing activities are on the decline.
7. The principles of sustainability and the norms related to the conservation of the environment and ecology are generally ignored; the coastal environment is becoming irreversibly degraded as evidenced by the concretization of beaches.

³⁶ Wilson, D. 1997. *Strategies for Sustainability: Lessons from Goa and Seychelles in Sustainable Tourism*. M. Stabler (Ed.) Wallingford: CAB International.

It is clear that there is much to be learned about the impacts of tourism in Goa, and that further planning and development requires information gaps to be filled. More specifically, the following actions are needed:

1. A careful study on the type of tourism that best suits Goa: up-scale, low budget or a combination of the two.
2. Recognition that tourism is a vulnerable industry, subject to the fads of the trade; hence, tourism cannot be allowed to permanently change the face of the coast in the long run.
3. A systematic study of the environmental impacts of tourism, through perhaps, a life cycle analysis, and the valuation of the environment to enable its integration into decision-making.
4. An understanding of the processes that make the Goan coast a preferred tourist destination rather than the hills or the hinterland areas.
5. A monitoring and management system to ensure the effectiveness of coastal and environmental regulations. The development of sustainability markers would be a way to ensure this. Such markers will enable both the industry and government to identify the emerging issues and to facilitate mitigation before problems becomes unmanageable. They can also serve as the basis for monitoring changes in the ecosystem, social and economic spheres.
6. The integration of the principles of coastal environment and ecology into the planning stage of any coastal activity, as preventative rather than remedial measures.
7. An environmental impact assessment and studies of Goa's coastal stretches including estuaries and backwaters.
8. Policies which recognize the type of interconnections among tourism, local communities and the environment, to ensure that tourism contributes to a sustainable development agenda.

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Authors' Acknowledgment

The authors thank Mr. E. D'Silva, EDI of the World Bank, Washington, DC for requesting National Institute of Oceanography to contribute this paper. They are grateful to Dr. E. Desa, Director, National Institute of Oceanography, for permission to present it. Dr. L. Noronha wishes to thank Dr. A. Siqueira, Department of Sociology, Goa University, for insightful discussions on socio-economic aspects of tourism.

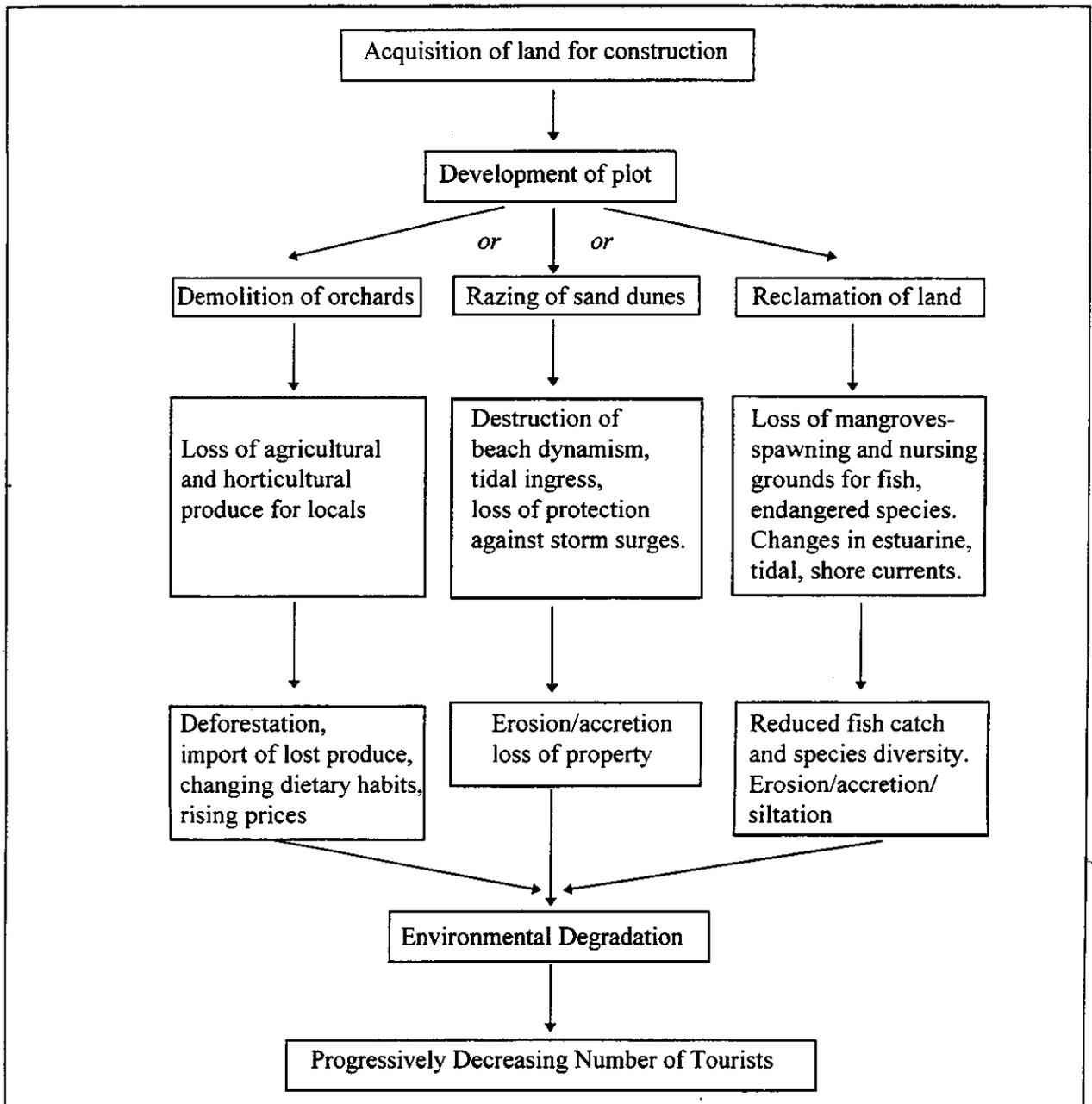
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IMPACTS OF CONSTRUCTION ACTIVITIES IN CLOSE PROXIMITY TO THE MARINE ENVIRONMENT

The field surveys undertaken during the survey of ecosensitive coastal areas of Goa show trends outlined in the flowchart depicted below:



Source: National Institute of Oceanography of India. 1996b. *Comments on the Coastal Zone Management Plans of Goa*. Report submitted to India, Ministry of Environment and Forests. New Delhi.